I. Amendments to the Claims

1. (Cancelled)

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) The system according to claim [4] <u>11</u>, wherein the control signal is based on the relationship

$$ControlSignal = \beta_1 \times TotalRideControl + \beta_2 \times HandlingControl + \beta_3 \times DiveSquatControl$$

where β_i are coefficients calculated based on the frequency of vibration and a summation of β_i is 1.

6. (Currently Amended) The system according to claim [4] <u>11</u>, wherein the ride control component includes a bounce control component, a roll control component, and a pitch control component.

7. (Original) The system according to claim 6, wherein the ride control is based on the relationship

$$\begin{aligned} RideControl = \alpha_1 \times BounceRideControl \\ + \alpha_2 \times PitchRideControl \\ + \alpha_3 \times RollRideControl \end{aligned}$$

where α_i are coefficients calculated based on the frequency of vibration and a summation of α_i is 1.

8. (Cancelled)

9. (Currently Amended) The system according to claim [8] 11, wherein the plurality of frequency ranges includes a low frequency range, a body mode frequency range, a medium frequency range, a wheel hop frequency range, and a high frequency range.

10. (Cancelled)

11. (Currently Amended) ~~The system according to claim 10,~~ A system for controlling an active suspension of a vehicle, having a bounce transmissibility, a roll transmissibility, and a pitch transmissibility, where the

bounce, pitch, and roll transmissibilities vary with respect to a frequency of vibration acting upon the vehicle, the system comprising:

a tunable device configured for adjusting stiffness and damping of the active suspension;

a controller in communication with the tunable device, the controller being configured to sense the frequencies of vibration and provide a control signal to the tunable device, wherein the control signal is based on a bounce component, a roll component, and a pitch component dependent on the bounce, pitch, and roll transmissibility at the sensed frequency, wherein the control signal includes a ride control component, a handling control component, and a dive/squat control component;

wherein the controller includes a plurality of control strategies corresponding to a plurality of frequency ranges, and the control signal is based on a control strategy of the plurality of control strategies corresponding to a frequency range of the plurality of frequency ranges that includes the frequency of vibration;

wherein the plurality of control strategies includes a passive suspension control strategy, a small stiffness and skyhook control strategy, a low damping control strategy, a high damping control strategy and stiff suspension strategy; and

wherein the bounce control component is based on the relationship

$$BounceControlComponent = \frac{A_1}{\varepsilon + \sum_{i=1}^{5} Ai} \times PassiveSuspension$$

$$+ \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} xSoft\_StiffnessControl + \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} xSkyhookControl$$

$$+ \frac{A_3}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

$$+ \frac{A_4}{\varepsilon + \sum_{i=1}^{5} Ai} \times HighDamping$$

$$+ \frac{A_5}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

where A_i are estimated amplitudes of the bounce acceleration for the corresponding frequency ranges, wherein A_1 corresponds to the low frequency range, A_2 corresponds to the body mode frequency range, A_3 corresponds to the medium frequency range, A_4 corresponds to the wheel hop frequency range, and A_5 corresponds to the high frequency range, and ε is a small number selected to avoid singularity.

12. (Currently Amended) ~~The system according to claim 8,~~ A system for controlling an active suspension of a vehicle, having a bounce transmissibility, a roll transmissibility, and a pitch transmissibility, where the

bounce, pitch, and roll transmissibilities vary with respect to a frequency of vibration acting upon the vehicle, the system comprising:

a tunable device configured for adjusting stiffness and damping of the active suspension;

a controller in communication with the tunable device, the controller being configured to sense the frequencies of vibration and provide a control signal to the tunable device, wherein the control signal is based on a bounce component, a roll component, and a pitch component dependent on the bounce, pitch, and roll transmissibility at the sensed frequency, wherein the control signal includes a ride control component, a handling control component, and a dive/squat control component;

wherein the controller includes a plurality of control strategies corresponding to a plurality of frequency ranges, and the control signal is based on a control strategy of the plurality of control strategies corresponding to a frequency range of the plurality of frequency ranges that includes the frequency of vibration;

wherein the plurality of control strategies includes a passive suspension control strategy, a small stiffness and skyhook control strategy, a low damping control strategy, a high damping control strategy and stiff suspension strategy; and

wherein the pitch control component is based on the relationship

$$PitchControlComponent = \frac{A_1}{\varepsilon + \sum_{i=1}^{5} Ai} \times PassiveSuspension$$

$$+ \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} x Soft\_StiffnessControl + \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} x SkyhookControl$$

$$+ \frac{A_3}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

$$+ \frac{A_4}{\varepsilon + \sum_{i=1}^{5} Ai} \times HighDamping$$

$$+ \frac{A_5}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

where A_i are estimated amplitudes of the pitch acceleration for the corresponding frequency ranges, wherein A_1 corresponds to the low frequency range, A_2 corresponds to the body mode frequency range, A_3 corresponds to the medium frequency range, A_4 corresponds to the wheel hop frequency range, and A_5 corresponds to the high frequency range, and ε is a small number selected to avoid singularity.

13. (Currently Amended) ~~The system according to claim 8,~~ A system for controlling an active suspension of a vehicle, having a bounce transmissibility, a roll transmissibility, and a pitch transmissibility, where the

bounce, pitch, and roll transmissibilities vary with respect to a frequency of vibration acting upon the vehicle, the system comprising:

a tunable device configured for adjusting stiffness and damping of the active suspension;

a controller in communication with the tunable device, the controller being configured to sense the frequencies of vibration and provide a control signal to the tunable device, wherein the control signal is based on a bounce component, a roll component, and a pitch component dependent on the bounce, pitch, and roll transmissibility at the sensed frequency, wherein the control signal includes a ride control component, a handling control component, and a dive/squat control component;

wherein the controller includes a plurality of control strategies corresponding to a plurality of frequency ranges, and the control signal is based on a control strategy of the plurality of control strategies corresponding to a frequency range of the plurality of frequency ranges that includes the frequency of vibration;

wherein the plurality of control strategies includes a passive suspension control strategy, a small stiffness and skyhook control strategy, a low damping control strategy, a high damping control strategy and stiff suspension strategy; and

wherein the roll control component is based on the relationship

$$RollControlComponent = \frac{A_1}{\varepsilon + \sum_{i=1}^{5} Ai} \times PassiveSuspension$$

$$+ \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} \times Soft\_StiffnessControl + \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} \times SkyhookControl$$

$$+ \frac{A_3}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

$$+ \frac{A_4}{\varepsilon + \sum_{i=1}^{5} Ai} \times HighDamping$$

$$+ \frac{A_5}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

where A_i are estimated amplitudes of the roll acceleration for the corresponding frequency ranges, wherein A_1 corresponds to the low frequency range, A_2 corresponds to the body mode frequency range, A_3 corresponds to the medium frequency range, A_4 corresponds to the wheel hop frequency range, and A_5 corresponds to the high frequency range, and ε is a small number selected to avoid singularity.

14. (Cancelled)

15. (Cancelled)

16. (Currently Amended) The system according to claim ~~15~~ 17, wherein the plurality of control strategies includes a passive suspension control strategy, a small stiffness and skyhook control strategy, a low damping control strategy, a high damping control strategy and stiff suspension strategy

17. (Currently Amended) ~~The system according to claim 15,~~ A system for controlling an active suspension of a vehicle, having a bounce transmissibility, a roll transmissibility, and a pitch transmissibility, where the bounce, pitch, and roll transmissibilities vary with respect to a frequency of vibration acting upon the vehicle, the system comprising:

a tunable device configured for adjusting stiffness and damping of the active suspension;

a controller in communication with the tunable device, the controller being configured to sense the frequencies of vibration and provide a control signal to the tunable device, wherein the control signal is based on a bounce component, a roll component, and a pitch component dependent on the bounce, pitch, and roll transmissibility at the sensed frequency wherein the controller includes a plurality of control strategies corresponding to a plurality of frequency ranges, and the control signal is based on a control strategy of the plurality of control strategies corresponding to a frequency range of the plurality of frequency ranges that includes the frequency of vibration;

wherein the plurality of frequency ranges includes a low frequency range, a body mode frequency range, a medium frequency range, a wheel hop frequency range, and a high frequency range; and

wherein the bounce control component is based on the relationship

$$BounceControlComponent = \frac{A_1}{\varepsilon+\sum_{i=1}^{5} Ai} \times PassiveSuspension$$

$$+\frac{A_2}{\varepsilon+\sum_{i=1}^{5} Ai} xSoft\_StiffnessControl + \frac{A_2}{\varepsilon+\sum_{i=1}^{5} Ai} xSkyhookControl$$

$$+\frac{A_3}{\varepsilon+\sum_{i=1}^{5} Ai} \times LowDamping$$

$$+\frac{A_4}{\varepsilon+\sum_{i=1}^{5} Ai} \times HighDamping$$

$$+\frac{A_5}{\varepsilon+\sum_{i=1}^{5} Ai} \times LowDamping$$

where A_i are estimated amplitudes of the bounce acceleration for the corresponding frequency ranges, wherein A_1 corresponds to the low frequency range, A_2 corresponds to the body mode frequency range, A_3 corresponds to the medium frequency range, A_4 corresponds to the wheel hop frequency range, and A_5 corresponds to the high frequency range, and ε is a small number selected to avoid singularity.

BRINKS HOFER GILSON & LIONE
PO Box 10395
Chicago, IL 60611-5599

18. (Currently Amended) ~~The system according to claim 15,~~ A system for controlling an active suspension of a vehicle, having a bounce transmissibility, a roll transmissibility, and a pitch transmissibility, where the bounce, pitch, and roll transmissibilities vary with respect to a frequency of vibration acting upon the vehicle, the system comprising:

a tunable device configured for adjusting stiffness and damping of the active suspension;

a controller in communication with the tunable device, the controller being configured to sense the frequencies of vibration and provide a control signal to the tunable device, wherein the control signal is based on a bounce component, a roll component, and a pitch component dependent on the bounce, pitch, and roll transmissibility at the sensed frequency wherein the controller includes a plurality of control strategies corresponding to a plurality of frequency ranges, and the control signal is based on a control strategy of the plurality of control strategies corresponding to a frequency range of the plurality of frequency ranges that includes the frequency of vibration;

wherein the plurality of frequency ranges includes a low frequency range, a body mode frequency range, a medium frequency range, a wheel hop frequency range, and a high frequency range; and

wherein the pitch control component is based on the relationship

$$PitchControlComponent = \frac{A_1}{\varepsilon + \sum_{i=1}^{3} Ai} \times PassiveSuspension$$

$$+\frac{A_2}{\varepsilon+\sum_{i=1}^{5}Ai} \times Soft\_StiffnessControl + \frac{A_2}{\varepsilon+\sum_{i=1}^{5}Ai} \times SkyhookControl$$

$$+\frac{A_3}{\varepsilon+\sum_{i=1}^{5}Ai} \times LowDamping$$

$$+\frac{A_4}{\varepsilon+\sum_{i=1}^{5}Ai} \times HighDamping$$

$$+\frac{A_5}{\varepsilon+\sum_{i=1}^{5}Ai} \times LowDamping$$

where A_i are estimated amplitudes of the pitch acceleration for the corresponding frequency ranges, wherein A_1 corresponds to the low frequency range, A_2 corresponds to the body mode frequency range, A_3 corresponds to the medium frequency range, A_4 corresponds to the wheel hop frequency range, and A_5 corresponds to the high frequency range, and ε is a small number selected to avoid singularity.

19. (Currently Amended) ~~The system according to claim 15,~~ A system for controlling an active suspension of a vehicle, having a bounce transmissibility, a roll transmissibility, and a pitch transmissibility, where the bounce, pitch, and roll transmissibilities vary with respect to a frequency of vibration acting upon the vehicle, the system comprising:

a tunable device configured for adjusting stiffness and damping of the active suspension;

a controller in communication with the tunable device, the controller being configured to sense the frequencies of vibration and provide a control signal to the tunable device, wherein the control signal is based on a bounce component, a roll component, and a pitch component dependent on the bounce, pitch, and roll transmissibility at the sensed frequency wherein the controller includes a plurality of control strategies corresponding to a plurality of frequency ranges, and the control signal is based on a control strategy of the plurality of control strategies corresponding to a frequency range of the plurality of frequency ranges that includes the frequency of vibration;

wherein the plurality of frequency ranges includes a low frequency range, a body mode frequency range, a medium frequency range, a wheel hop frequency range, and a high frequency range; and

wherein the roll control component is based on the relationship

$$RollControlComponent = \frac{A_1}{\varepsilon + \sum_{i=1}^{5} Ai} \times PassiveSuspension$$

$$+ \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} \times Soft\_StiffnessControl + \frac{A_2}{\varepsilon + \sum_{i=1}^{5} Ai} \times SkyhookControl$$

$$+ \frac{A_3}{\varepsilon + \sum_{i=1}^{5} Ai} \times LowDamping$$

$$+ \frac{A_4}{\varepsilon + \sum_{i=1}^{5} Ai} \times HighDamping$$

$$+\frac{A_5}{\varepsilon+\sum_{i=1}^{5} Ai} \times LowDamping$$

where A_i are estimated amplitudes of the roll acceleration for the corresponding frequency ranges, wherein A_1 corresponds to the low frequency range, A_2 corresponds to the body mode frequency range, A_3 corresponds to the medium frequency range, A_4 corresponds to the wheel hop frequency range, and A_5 corresponds to the high frequency range, and ε is a small number selected to avoid singularity.